WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

an electrode on an insulating surface;

an insulating film covering said electrode;

a semiconductor layer having at least a channel-forming region, a source region, and a drain region on said insulating film, said channel-forming region comprising:

silicon and germanium;

nitrogen and carbon at less than 5×10^{18} /cm^3 as detected by SIMS;

oxygen at less than 1×10^{19} /cm^3 as detected by SIMS; and

a plurality of crystal planes as measured by EBSP method in which an electron beam of 20 nm or less in a spot diameter is irradiated to a plurality of different points of said channel-forming region,

wherein ratios of said plurality of crystal planes which form an angle equal to or less than 10° with a substrate surface is larger or equal to 20% in {101} plane, less than or equal to 3% in {001} plane, and less than or equal to 5% in {111} plane.

2. The semiconductor device according to claim 1, wherein said germanium contained in said channel-forming region is larger than or equal to 0.1 atom%, and less than or equal to 10 atom%.

3. The semiconductor device according to claim 1, wherein said channel-forming region has a germanium concentration gradient in which said germanium concentration becomes larger with increasing a distance from an interface with said insulating film.

4. The semiconductor device according to claim 1, wherein a concentration of a metal element contained in said channel-forming region is less than 1×10^{17} /cm^3.

5. The semiconductor device according to claim 4, wherein said metal element is one or a plurality of elements selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd,

Os, Ir, Pt, Cu, and Au.

6. The semiconductor device according to claim 1, wherein said electrode comprises a gate electrode.

7. The semiconductor device according to claim 1, wherein said insulating film covering said electrode comprises a gate insulating film.

8. The semiconductor device according to claim 1, wherein a thickness of said semiconductor layer is between 20 and 100 nm.

9. The semiconductor device according to claim 1, wherein said semiconductor device is an electro-luminescence display device.

10. The semiconductor device according to claim 1, wherein said semiconductor device is one selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle-type display, a digital camera, a projector, and a mobile telephone.

11. A semiconductor device comprising thin film transistors in a pixel portion and in a driver circuit formed over a same insulating surface, said semiconductor device comprising:

an electrode on said insulating surface;

an insulating film covering said electrode;

a semiconductor layer having at least a channel-forming region, a source region, and a drain region on said insulating film, said channel-forming region comprising:

silicon and germanium;

nitrogen and carbon at less than 5×10^{18} /cm^3 as detected by SIMS;

oxygen at less than 1×10^{19} /cm^3 as detected by SIMS; and

a plurality of crystal planes as measured by EBSP method in which an electron

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beam of 20 nm or less in a spot diameter is irradiated to a plurality of different points of said channel-forming region,

wherein ratios of said plurality of crystal planes which form an angle equal to or less than 10° with a substrate surface is larger or equal to 20% in {101} plane, less than or equal to 3% in {001} plane, and less than or equal to 5% in {111} plane, and

wherein all said thin film transistors in said pixel portion and in said driver circuit are n-channel thin film transistors.

12. The semiconductor device according to claim 11, wherein said germanium contained in said channel-forming region is larger than or equal to 0.1 atom%, and less than or equal to 10 atom%.

13. The semiconductor device according to claim 11, wherein said channel-forming region has a germanium concentration gradient in which said germanium concentration becomes larger with increasing a distance from an interface with said insulating film.

14. The semiconductor device according to claim 11, wherein a concentration of a metal element contained in said channel-forming region is less than 1×10^{17} /cm^3.

15. The semiconductor device according to claim 14, wherein said metal element is one or a plurality of elements selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

16. The semiconductor device according to claim 11, wherein said electrode comprises a gate electrode.

17. The semiconductor device according to claim 11, wherein said insulating film covering said electrode comprises a gate insulating film.

18. The semiconductor device according to claim 11, wherein a thickness of said semiconductor layer is between 20 and 100 nm.

19. The semiconductor device according to claim 11, wherein said semiconductor device is an electro-luminescence display device.

20. The semiconductor device according to claim 11, wherein said semiconductor device is one selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle-type display, a digital camera, a projector, and a mobile telephone.

21. A semiconductor device comprising thin film transistors in a pixel portion and in a driver circuit formed over a same insulating surface, said semiconductor device comprising:

an electrode on said insulating surface;

an insulating film covering said electrode;

a semiconductor layer having at least a channel-forming region, a source region, and a drain region on said insulating film, said channel-forming region comprising:

silicon and germanium;

nitrogen and carbon at less than 5×10^{18} /cm^3 as detected by SIMS;

oxygen at less than 1×10^{19} /cm^3 as detected by SIMS; and

a plurality of crystal planes as measured by EBSP method in which an electron beam of 20 nm or less in a spot diameter is irradiated to a plurality of different points of said channel-forming region,

wherein ratios of said plurality of crystal planes which form an angle equal to or less than 10° with a substrate surface is larger or equal to 20% in {101} plane, less than or equal to 3% in {001} plane, and less than or equal to 5% in {111} plane, and

wherein all said thin film transistors in said pixel portion and in said driver circuit are p-channel thin film transistors.

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22. The semiconductor device according to claim 21, wherein said germanium contained in said channel-forming region is larger than or equal to 0.1 atom%, and less than or equal to 10 atom%.

23. The semiconductor device according to claim 21, wherein said channel-forming region has a germanium concentration gradient in which said germanium concentration becomes larger with increasing a distance from an interface with said insulating film.

24. The semiconductor device according to claim 21, wherein a concentration of a metal element contained in said channel-forming region is less than 1×10^{17} /cm^3.

25. The semiconductor device according to claim 24, wherein said metal element is one or a plurality of elements selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

26. The semiconductor device according to claim 21, wherein said electrode comprises a gate electrode.

27. The semiconductor device according to claim 21, wherein said insulating film covering said electrode comprises a gate insulating film.

28. The semiconductor device according to claim 21, wherein a thickness of said semiconductor layer is between 20 and 100 nm.

29. The semiconductor device according to claim 21, wherein said semiconductor device is an electro-luminescence display device.

30. The semiconductor device according to claim 21, wherein said semiconductor device is one selected from the group consisting of a personal computer, a video camera, a

mobile computer, a goggle-type display, a digital camera, a projector, and a mobile telephone.

31. A semiconductor device comprising thin film transistors in a pixel portion and in a driver circuit formed over a same insulating surface, said semiconductor device comprising:

an electrode on said insulating surface;

an insulating film covering said electrode;

a semiconductor layer having at least a channel-forming region, a source region, and a drain region on said insulating film, said channel-forming region comprising:

silicon and germanium;

nitrogen and carbon at less than 5×10^{18} /cm^3 as detected by SIMS;

oxygen at less than 1×10^{19} /cm^3 as detected by SIMS; and

a plurality of crystal planes as measured by EBSP method in which an electron beam of 20 nm or less in a spot diameter is irradiated to a plurality of different points of said channel-forming region,

wherein ratios of said plurality of crystal planes which form an angle equal to or less than 10° with a substrate surface is larger or equal to 20% in {101} plane, less than or equal to 3% in {001} plane, and less than or equal to 5% in {111} plane, and

wherein all said thin film transistors in said pixel portion and in said driver circuit are n-channel thin film transistors or p-channel thin film transistors.

32. The semiconductor device according to claim 31, wherein said germanium contained in said channel-forming region is larger than or equal to 0.1 atom%, and less than or equal to 10 atom%.

33. The semiconductor device according to claim 31, wherein said channel-forming region has a germanium concentration gradient in which said germanium concentration becomes larger with increasing a distance from an interface with said insulating film.

34. The semiconductor device according to claim 31, wherein a concentration of a metal element contained in said channel-forming region is less than 1×10^{17} /cm^3.

35. The semiconductor device according to claim 34, wherein said metal element is one or a plurality of elements selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

36. The semiconductor device according to claim 31, wherein said electrode comprises a gate electrode.

37. The semiconductor device according to claim 31, wherein said insulating film covering said electrode comprises a gate insulating film.

38. The semiconductor device according to claim 31, wherein a thickness of said semiconductor layer is between 20 and 100 nm.

39. The semiconductor device according to claim 31, wherein said semiconductor device is an electro-luminescence display device.

40. The semiconductor device according to claim 31, wherein said semiconductor device is one selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle-type display, a digital camera, a projector, and a mobile telephone.

41. A semiconductor device comprising thin film transistors in a pixel portion formed over an insulating surface, said semiconductor device comprising:

an electrode on said insulating surface;

an insulating film covering said electrode;

a semiconductor layer having at least a channel-forming region, a source region,

and a drain region on said insulating film, said channel-forming region comprising:

silicon and germanium;

nitrogen and carbon at less than 5×10^{18} /cm^3 as detected by SIMS;

oxygen at less than 1×10^{19} /cm^3 as detected by SIMS; and

a plurality of crystal planes as measured by EBSP method in which an electron beam of 20 nm or less in a spot diameter is irradiated to a plurality of different points of said channel-forming region,

wherein ratios of said plurality of crystal planes which form an angle equal to or less than 10° with a substrate surface is larger or equal to 20% in {101} plane, less than or equal to 3% in {001} plane, and less than or equal to 5% in {111} plane.

42. The semiconductor device according to claim ~~40,~~ 41 wherein said germanium contained in said channel-forming region is larger than or equal to 0.1 atom%, and less than or equal to 10 atom%.

43. The semiconductor device according to claim ~~40,~~ 41 wherein said channel-forming region has a germanium concentration gradient in which said germanium concentration becomes larger with increasing a distance from an interface with said insulating film.

44. The semiconductor device according to claim ~~40,~~ 41 wherein a concentration of a metal element contained in said channel-forming region is less than 1×10^{17} /cm^3.

45. The semiconductor device according to claim 44, wherein said metal element is one or a plurality of elements selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

46. The semiconductor device according to claim ~~40~~ 41, wherein said electrode comprises a gate electrode.

47. The semiconductor device according to claim ~~40,~~ 41 wherein said insulating film covering said electrode comprises a gate insulating film.

48. The semiconductor device according to claim ~~40~~ 41, wherein a thickness of said semiconductor layer is between 20 and 100 nm.

49. The semiconductor device according to claim ~~40,~~ 41 wherein said semiconductor device is an electro-luminescence display device.

50. The semiconductor device according to claim ~~40,~~ 41 wherein said semiconductor device is one selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle-type display, a digital camera, a projector, and a mobile telephone.